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The Dynamics of Organizational Culture: The Case of Culture Work in a Digital Hospital

Completed Research Paper

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Abstract

With the increasing infusion of information systems throughout organizations, a dynamic understanding of the relationship between cultural values and artifacts is critical. This paper responds to calls to explore organizational culture from a dynamic perspective rather than the traditional approach that assumes culture is static. We performed a case study using grounded theory principles of a digital transformation of a large, acute-care hospital in Australia. Our analysis reveals new insights into the dynamic relationship between the values of the new system (artifact) and the values of the organization, referred to as retroactive and proactive realization respectively. We extend past research, by developing a process model that reveals how different types of culture work – the actions and doings through which culture is created, maintained, and disrupted – are invoked during the realization processes. This research deepens our understanding of the realization process and alignment literature with numerous implications for research and practice.

Keywords: Organizational culture, cultural values, culture work, cultural dynamics, proactive realization, retroactive realization, healthcare, case study

Introduction

The importance of organizational culture – defined as sets of assumptions, values, and artifacts (Schein 1984) – on the development and use of information systems is well-known (Karahanna et al. 2005; Leidner and Kayworth 2006). With the increasing infusion of information systems throughout organizations, the importance of organizational culture is only growing over time (Jackson 2011). To contribute towards a better understanding of its effects, the aim of this paper is to respond to repeated calls in the IS field to explore organizational culture from a *dynamic* perspective rather than follow the traditional approach that assumes culture is persistent and static (Gallivan and Srite 2005; Jackson 2011).

To make this shift to a dynamic perspective, we draw on and extend the Cultural Dynamics Model (CDM) (Hatch 1993). CDM identifies, among other concepts, how cultural values influence the formation of artifacts (e.g. Information Systems) through a process known as *proactive realization*, and how artifacts influence organizational values, through a process known as *retroactive realization*. We apply and extend these ideas to present a new, dynamic perspective on organizational culture in an IS context.

Even though the CDM acknowledges that different values may be held in an organization, this issue was not taken into account in the CDM's conceptualization. This may have been reasonable at the time it was developed, but researchers have since stressed the need to move beyond an assumption of a single 'unified' culture to acknowledge that many subcultures can exist that relate to the overarching culture in different ways (Detert et al. 2000; Iivari and Huisman 2007). Much IS research has assumed a unitary

perspective on culture (Jackson 2011), but recognition of the importance of subcultures is growing (Ravishankar et al. 2011). The different values within an organization - whether in the form of subcultures or just multiple values being present rather than an overarching singular value - could help explain differences in IT adoption and use.

We explore these issues of dynamics in the healthcare context. The healthcare industry is in the midst of a digital transformation involving, to a large extent, the adoption of large packaged software systems such as electronic medical record systems (EMRs) (Agarwal et al. 2010; Klecun 2016). The outcomes of many of these transformations have been mixed (Eden et al. 2017) and ‘messy’ (Klecun 2016) resulting from strong professional subcultures (Fichman et al. 2011). The characteristics of this industry, therefore, provide an excellent context for studying cultural dynamics (Ward 2013).

To enable an exploration of dynamics, we adopt a practice-based lens (Feldman and Orlikowski 2011; Pentland and Feldman 2008) by shifting the unit of analysis from culture as a thing to *culture work*: the actions and doings through which culture is created, maintained, and disrupted. Using the terminology of the CDM (proactive and retroactive realization), our research question is:

How is culture work invoked throughout proactive and retrospective realization processes in an organizational change project?

We explore this question through a case study of the digital transformation of a large, acute-care hospital. Grounded theory principles were used throughout data collection and analysis. As such, we did not set out to study organizational culture at the outset. Rather, the issue became highly salient during our data collection, and we followed the phenomenon in an effort to understand it over time. As our data collection and theorizing continued, we found that we were developing insights of importance both to IS as well as to existing theories such as the CDM.

The paper is structured as follows. In the next section, we present our literature review, which provides an overview of key organization culture studies and examines how organizational culture has been examined in the IS field. Subsequently, we describe the case study method we used and the salience of organizational culture in the case. We then present the findings into the different types of culture work that emerged in the case and conclude with a discussion of how this model extends upon prior research.

Literature Review

In this section, we first review research on organizational culture in general, with an emphasis on Schein (1984) and Hatch (1993). We then review how organizational culture has been examined in top IS outlets.

Understanding Organizational Culture

Organizational culture is pervasive, ubiquitous (Schein 1984), diverse and differentiated (Gallivan and Srite 2005) and is known to have a strong effect on human behavior (Karahanna et al. 2006; Straub et al. 2002; Van Maanen and Barley 1983). Countless definitions of the concept exist. As Iivari and Huisman (2007) state “organizational culture can be construed to cover almost anything in an organization.” We draw upon Schein’s (1984) Model of Organizational Culture, which focuses on basic assumptions, values, and artifacts:

Basic assumptions: Taken for granted, invisible, ideational, and tacit understandings of the nature of human’s and their behavior (Schein 1984).

Values: More confrontable than basic assumptions (Schein 1984), they are “social principles, philosophies, goals, and standards considered to have intrinsic worth” (Hatch 1993).

Artifacts: The visible and tangible elements of an organization’s culture including technology, art, and behavioural patterns (Schein 1984).

Assumptions, values, and artifacts are not static, they are “always in the process of formation and change” in which artifacts shape and are shaped by values, which also shape and are shaped by assumptions (Schein 1984). While Schein (1984) acknowledged this view, he did not delve deeply into dynamics. The Cultural Dynamics Model (CDM) (Hatch 1993) took up this challenge to explain how cultural dimensions transform over time. In doing so, Hatch (1993) used a symbolic-interpretive approach and introduced a

fourth dimension of culture, symbols, which are “anything that represents a conscious or an unconscious association with some wider usually more abstract concept or meaning”. Hatch (1993) also proposed four dynamics: manifestation, realization, symbolization, and interpretation, which can occur in two directions, proactively and retroactively.

Manifestation: the process underlying the relationship between assumptions to values and values to assumption. The former is referred to as proactive manifestation and the latter is retrospective manifestation (Hatch 1993). The outcome of the manifestation process is cultural maintenance or cultural alteration. Cultural maintenance occurs when assumptions and values are harmonious, whereas alteration occurs when they are at odds (Hatch 1993).

Realization: the process underlying the relationship between values and artifacts. Proactive realization involves the transformation of values to artifacts, whereas retroactive realization is where artifacts transform into values (Hatch 1993). Similar to manifestation if artifacts and values are in alignment, cultural values are maintained. However when artifacts are produced by another culture or by forces misaligned with cultural values, the realization process can challenge organizational values (Hatch 1993). When cultural values are challenged and rejected, the artifact can be ignored or ejected by organizational members (Hatch 1993).

Symbolization: the process underlying the relationship between artifacts and symbols. Proactive symbolization associates a meaning to an artifact. “Artifacts must be translated into symbols if they are to be apprehended as culturally significant objects” (Hatch 1993, p. 670). Retroactive symbolization enhances the meaning of the artifact and takes into account the significance of the artifact at a particular point in time (Hatch 1993).

Interpretation: the process underlying the relationship between symbols and assumptions. The meaning of the symbolized artifact is established retrospectively through interpretation (Hatch 1993). “The assumptions provide the already known of the interpretation process” (Hatch 1993).

In this paper, we focus on the realization process, proactive and retroactive, as it is central to the values held both by organizations and Information System artifacts¹. While CDM provides an excellent starting point for understanding the dynamics of organizational culture, it has a simple view of culture and artifacts that we seek to overcome. Specifically, the CDM does not get into the complexity that can arise when organizations have multiple cultural values and when some parts of an artifact can be in alignment and other parts out of alignment with an organization’s values. We show in this paper how researchers can extend the CDM to do so.

Review of Organizational Culture in the IS Discipline

In this section, we review Information Systems (IS) literature related to organizational culture.

Literature Review Method

Recognizing the salience of organizational culture in our dataset, particularly the dynamic interplay between values and artifacts, we performed a narrative review of the literature following the guidelines of Tempier and Paré (2015). The objectives of the literature review were:

- i) To understand how organizational culture has been examined in relation to the realization process
- ii) To synthesize the core gaps in the literature related to organizational culture
- iii) To identify how our grounded findings differ from prior literature (presented in discussion)

¹ Readers unfamiliar with the CDM may be unaccustomed with the terms of proactive and retroactive realization. Simply put, proactive realization is when the organization’s values are realized in an artefact, e.g., through the way in which an organization chooses, configures, or builds a system to align with the values of that organization. Retroactive realization is when the values in the artifact are realized by and transform the organization’s values e.g. an IS produced by an external vendor may challenge and transform an organization’s current values.

We searched for articles with “organizational culture” or “organizational subcultures” in the title, abstract, or keywords. We limited the search to articles published from 2000 onwards, so that we could learn how culture has been studied relatively recently. The intent of the review was not to provide an exhaustive account of all organizational culture research. Rather it was to provide indicative evidence of the extent to which culture has been examined in highly ranked journals. As such, the search was limited to articles in the Senior Scholars Basket of 8 journals² (Association for Information Systems 2011). While good papers are published in other journals too, the basket provides a representative set of highly influential studies (Lowry et al. 2013). Due to the importance of research in Management on the concept of culture, we also supplemented our search by searching for articles published in the *Academy of Management Journal* and *Academy of Management Review*.

30 articles were returned by the search. We read the articles in full and determined their relevance by applying the inclusion criteria of: the paper must examine organizational culture in relation to a behavior or an artifact. After applying inclusion criteria 21 studies remained (15 from IS, 6 from management). We then re-read the relevant articles extracting information pertaining to: i) level of culture (e.g. organizational, subcultures), ii) dimensions of culture (assumptions, values, artifacts), iii) nature of the artifact, and iv) whether the realization process was present. The following section details the findings of the review.

Literature Review Findings

We found many perspectives of organizational culture were examined, ranging from narrow (e.g. cultural strength (Canessa and Riolo 2006)) and specific (e.g. assumptions (Ravasi and Schultz 2006), values (Alavi et al. 2005; Bradley et al. 2006; Chatman and Spataro 2005; Erdogan et al. 2006; Fayard et al. 2016; Jarvenpaa and Staples 2001; Kanungo et al. 2001; Koch et al. 2013; Rivard et al. 2011), culture types based on a combination of values (Iivari and Huisman 2007)), to broad conceptualizations whereby culture was examined as a holistic concept (e.g. Boersma and Kingma 2005; Igira 2008; Leidner and Kayworth 2006; O’Neill and Rothbard 2017; Phang et al. 2008; Ravishankar et al. 2011) as opposed to being isolated into specific assumptions, values, and beliefs.

We delved deeply into studies investigating values or groupings of values as they are core to the realization process. We found a diverse array of values have been examined, in almost every study different values were present. The values include: expertise, formalization, innovativeness, collaboration, autonomy (Alavi et al. 2005), entrepreneurial, formal (Bradley et al. 2006), algorithmic, human-centered (Fayard et al. 2016), group, developmental, rational, hierarchical (Iivari and Huisman 2007), solidarity, sociability, need for achievement, job orientation, openness (Jarvenpaa and Staples 2001), bureaucratic, supportive (Kanungo et al. 2001), collectivism, individualism (Chatman and Spataro 2005), respect, aggressiveness, and team orientation (Erdogan et al. 2006). While there are overlaps among some values (e.g., collaboration, socialization, collectivism, team orientation), we found that authors tended to study values that were context specific and informed by the case site. This suggests that when qualitatively studying cultural values, researchers should ground their work in data rather than a preconceived deductive framework.

Another takeaway from examining values is that different values are associated with different outcomes. Alavi et al. (2005) identified how different cultural values were related to different approaches to using knowledge management systems (KMS), with the local value of collaboration associated with using the KMS for making connections and learning, whereas those who value autonomy use the KMS for only making connections. Similarly, Bradley et al. (2006) found the relationships between information quality and system quality with tactical use is stronger in an entrepreneurial culture than a formal culture. Different values are also linked to different IS development approaches (Iivari and Huisman 2007) and IS strategies (Kanungo et al. 2001). Most studies, excluding Alavi et al. (2005), looked upon an organization as having a single culture rather than having different cultural values. This tradition is problematic

² **EJIS**: European Journal of Information Systems; **ISJ**: Information Systems Journal, **ISR**: Information Systems Research; **JAIS**: Journal of the Association for Information Systems, **JIT**: Journal of Information Technology, **JMIS**: Journal of Management Information Systems, **JSIS**: Journal of Strategic Information Systems, **MISQ**: Management Information Systems Quarterly.

because different values can influence different behaviors. When examining realization processes - retroactive or proactive - one should consider specific values as different influences on the artifact or values could result.

The other critical component within the realization process is the artifact. Of the IS studies investigating culture, only 11 did so with reference to an IS artifact, and only 9 examined a specific IS. The IS examined included knowledge management (Alavi et al. 2005; Ravishankar et al. 2011), enterprise systems (Boersma and Kingma 2005; Strong and Volkoff 2010), health information systems (Igira 2008; Rivard et al. 2011), computer mediated communication (Canessa and Riolo 2006), crowd sourcing (Fayard et al. 2016), social networks (Koch et al. 2013), and eGovernment (Phang et al. 2008).

Despite articles examining values and artifacts, the realization process was not salient in literature and was not explicit in any paper, rather it went unstated. Instead, the core theme pertained to concepts related to alignment (Ravishankar et al. 2011), fit (Strong and Volkoff 2010), and conflict (Leidner and Kayworth 2006). Due to the salience of alignment in the literature we further explore the concept. Alignment is defined as the “degree to which the needs, demands, goals, objectives and /or structure of one component are consistent with the needs, demands, goals, objectives, and / or structures of another component” (Ravishankar et al. 2011, p. 40). The concept of IT alignment has a long standing research tradition in the discipline, evolving overtime to include multiple types, including: strategic alignment, structural alignment, and cultural alignment (Chan and Reich 2007).

In investigating alignment, Ravishankar et al. (2011) was primarily interested in extent of alignment or lack thereof between the subcultures within an organization and the organization’s overarching culture. In doing so, they identified three different types of subcultures: enhancing, counter, and chameleon. Enhancing subcultures have a tendency to accept IS enforced on them, whereas counter subcultures do not, and chameleon subcultures base their acceptance or resistance off the subculture they reside in. While explicitly examining alignment between subcultures and the organization’s culture, they did not examine the alignment between the IS and the subculture, rather it was implied with different IS development strategies (e.g., top-down, bottom-up) recommended for different subcultures. These recommendations ultimately would shape the IT artefact and links to proactive realization.

Recognizing values are attributed to a technology artefact by groups (i.e., IT culture) (Leidner and Kayworth 2006), an alternate perspective of alignment examines whether the system culture is consistent with the values of the organization. This perspective of alignment is often observed in studies investigating fit (Strong and Volkoff 2010), and conflict (Leidner and Kayworth 2006). For instance, Koch et al. (2013) drew upon the theory of IT-culture conflict and examined alignment between an organization’s social networking system’s values and the organization’s values. In their study, the social networking system was not in alignment with the organization and the system was purposely implemented to transform the organization’s culture. The system was implemented and was coupled by policy, socialization, and leadership-based mechanisms to transform the culture. Thus linking to retroactive realization, but goes further by illustrating that for an IS to transform cultural values the implementation needs to be accompanied by additional organizational strategies. Others found when the system did not fit the value of organizational members or groups of organizational members, the system could be discontinued (Boersma and Kingma 2005) or modified (Rivard et al. 2011) through proactive realization.

To summarize, the primary takeaway from the IS literature regarding the cultural realization process is that if misalignment is present then the realization process can occur. However, the literature has not yet dug deeper to examine which specific values are out of alignment nor what occurs when alignment is present. These issues need to be addressed if researchers are to have an adequate understanding of cultural dynamics. In the next section, we describe the case study we conducted to address these issues.

Method

We performed a qualitative case study using principles from grounded theory (Glaser 1978). As such, we went into the case organization with a broad objective (Eisenhardt 1989) of understanding the effective use and impacts of a complex integrated information system. However, during data collection, organizational culture emerged as a highly salient theme. In this section, we provide details on the case, data collection procedures and data analysis techniques used.

Case Organization

We investigated the digital transformation of a large public hospital in Australia. The hospital has over 6,000 staff, more than 150,000 admissions and 500,000 outpatient appointments per year. Motivated by the need to support the patient journey across all units and professions, the hospital commenced a digital transformation seeking to become a ‘digital hospital’ by implementing an integrated health information system (HIS). The HIS consisted of an electronic medical record (EMR), computerized provider order entry (CPOE), ePrescribing, and clinical decision support systems (CDSS) with wireless device integration³.

The implementation occurred over two waves. The first, implemented in November 2015, involved the EMR, CPOE, preliminary CDSS, and wireless device integration. The second, implemented in March 2017, involved integrating the solution from wave 1 with ePrescribing and related CDSS. The first phase was largely considered an incremental change, whereas the second phase was more of a revolutionary change. The implementation was considered a success with benefits related to patient outcomes, resource utilization, adherence to guidelines, time management, and accountability.

Data Collection and Analysis

Interviews and focus groups were our primary data collection technique supplemented by observations and documentation analysis. We used the go-live as a ‘window of opportunity’ for understanding user practices (Tyre and Orlikowski 1994). Therefore data was collected before and after the go-live of wave 2. The first phase of data collection (01/2017 to 03/2017) examined the impacts of the first wave and the expectations regarding the second. The second phase (03/2017 to 05/2017) examined the impacts of the second wave.

As previously highlighted, we set out with a broad objective of understanding the digital hospital transformation in terms of the effective use and impacts. We commenced with sampling participants based on our understanding of who will use the system (developed from preliminary meetings). We determined that a mixture of executives, doctors, nurses, and allied health professionals should be interviewed to allow for constant comparisons, a central tenet of grounded theory (Glaser 1998). We performed semi-structured interviews and asked questions pertaining to the impacts and effective use of the HIS.

Akin to grounded theory, we continuously iterated between data collection and analysis (Eisenhardt and Graebner 2007). We commenced by open coding our qualitative data and did not have a “preconceived set of codes” (Fernández 2004). The central theme of hospital culture emerged, including core values. Over-time as data collection and analysis progressed, we identified that organizational culture was important in areas we had not previously sampled, so we switched to theoretical sampling and collected data from administrative personnel. We then on-coded the concepts related to organizational culture by constantly comparing the different culture quotes (Glaser 1978). We then progressed to theoretical coding (Suddaby 2006) and identified the relationships between the quotes we coded for organizational culture and between organizational culture and IS alignment.

During this process we continuously compared our findings with literature (Urquhart and Fernandez 2013), and identified that the Cultural Dynamics Model (CDM) may be relevant (Hatch 1993). However, our findings differed from CDM in significant ways (described in the discussion). We then performed further follow up interviews (denoted by phase 3) to deepen our understanding of the relationships between cultural values and the HIS. We continued this process until theoretical saturation was reached (Glaser and Strauss 1967). This process enhanced the accuracy of our findings through “managing preconceptions, continually comparing different slices of data, and checking on pieces of data that did not fit the emerging, integrated account” (Eden et al. 2017, p. 464).

³**EMR:** IS which provides longitudinal accounts of patients’ clinical information. **CPOE:** IS which communicates laboratory orders and results. **ePrescribing:** IS which supports ordering, prescribing, and administering of medications. **CDSS:** IS which supports clinical decision through real-time clinical alerts (Keasberry et al. 2018).

Overall 102 (see Table 1) individuals participated in interviews and/or focus groups, which lasted between 30 minutes and an hour. 64 individuals participated in all phases, with the remaining 38 only participating a single phase (11 in phase 1 only, 15 in phase 2 only, 12 in phase 3 only). All interviews were recorded, transcribed, and uploaded to nVivo, which was used as an electronic repository only, with all coding and memoing being electronically performed (as per Glaser 1998).

Role	Number of Participants			
	Phase 1	Phase 2	Phase 3	Overall*
Front line Clinicians				
• Allied Health	11	10	2	13
• Doctors	15	14	4	20
• Nurses	16	17	5	27
• Pharmacists	3	3	0	3
Management				
• Administrative	5	8	0	8
• Executive	17	18	2	18
• Other	8	10	4	13
Total	75	80	17	102

*The overall column is the 'unique' number of participants (e.g. only one executive participated in phase 2 that did not participate in phase 1, the executives who participated in phase 3 participated in all three rounds)

Findings

In this section, we first provide an overview of the hospital's culture including the shared cultural values and subculture apparent. We then provide examples of the culture work observed in the hospital.

The Hospital's Culture

The hospital's executive team has actively improved their culture over the past fifteen years, regularly investing in it and evaluating it. In doing so, they established a strong, stable leadership team with shared governance models where all core units are chaired equally by a doctor and a nurse. Many of our participants referred to the hospital's strong positive culture, as one executive states:

"[The hospital], in the ...Best Practice Australia survey, had the highest recorded morale in a public hospital in Australia in 20 years." (Executive F, pre-phase 1)

This strong culture serves as a 'cultural bank', which the executives can draw upon in times of turbulence, such as during the implementation. Yet, despite the implementation, they still maintained a strong culture.

"We worked very hard with our culture and we have just got our last culture surveys back. ...Despite all of this change... we have not brought any of our culture back. In fact many areas have improved." (Executive D, Post-Phase 2)

As mentioned previously, prior to the implementation, the hospital's culture was largely unified espousing values of collaboration, multidisciplinary, a can-do attitude, and patient centricity. However, within the hospital there was a key distinction when it came to one group, VMOs (Visiting Medical Officers). The VMOs did not identify with the hospital and held discrepant values associated with individualism and superiority. The VMOs strongly resisted and refused to use the system as stated by a senior doctor:

"There's some groups, notably orthopaedic surgeons (predominantly VMOs), who I don't think have ever opened the system, because they assume someone will do it for them. That's what they are used to, people always do things for them. ...They'll still keep their distance from it. ...It's just their attitude to things. Here they've got minions who will do everything"

for them, that's below them. That's a menial task. [To improve their use] you just have to keep at it over time, and some of them will grow old and die. That's part of the trouble. And it's trying to change that mindset of what's your job." (Senior doctor, Phase 1)

The VMOs were the minority in the hospital and represents an interesting aspect within the case. Yet when it came to culture, the divergent VMO subculture was not the most salient theme. In our dataset, the most salient theme pertained to the relationships between the hospital's values and the system's values and as such will be the focus of the following sections.

Culture Work

The key finding of this research pertains to the actions and doings of people through which culture is created, maintained, or disrupted, i.e., culture work. We identified six different types of culture work: transformation, maintenance, protection, constrained fit, IS optimization, and alignment. Each of which are explained in depth in the following subsections, which concludes with a summary of the activities involved in each type of culture work.

Transformation Culture Work

Despite some of the hospital's values being in alignment with the values afforded by the system, transformation of the hospital's values occurred. This occurred through the work of participants who realized the potential to improve themselves. This was particularly evident when it came to the nurse's cohort, who largely valued flexibility, as one nursing director states:

"There's more than one way to run a busy ...ward and we've got some great nurse unit managers. Each have their own flavor. They don't do it exactly the same as per the recipe book but they all get the same really good results" (DON A, Phase 2).

The system also valued flexibility and provided nurses with multiple places to document ranging from structured to unstructured fields. Further, members of the leadership team did not enforce an approach to documenting. Despite alignment, nurses became frustrated as they received poor audit results. These results were based on a chart audit and largely due to auditors only looking at a single section within the system as opposed to all possible locations. Instead of changing the audit process to fit the deficit, the nurses reflected and tried to identify whether they could improve themselves, as one executive states:

"We never stop looking at what the possibilities are and what the opportunities are because that is actually the new model of change" (Executive D, Post-Phase 2).

As a result, nurses started transforming and rather than valuing flexibility they shifted to valuing standardization (Figure 1), as evidenced below:

"The hospital is not... good at standardizing ...people like to do a bit of their own thing. ...[For] the fist time in this organization... Nurse Unit Managers are saying 'we will standardize the work flows'" (Executive D, Phase 1).

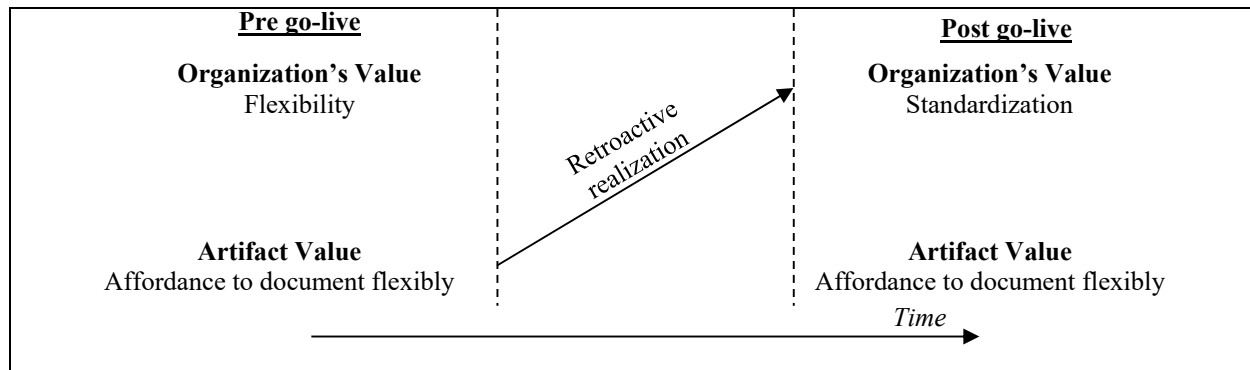


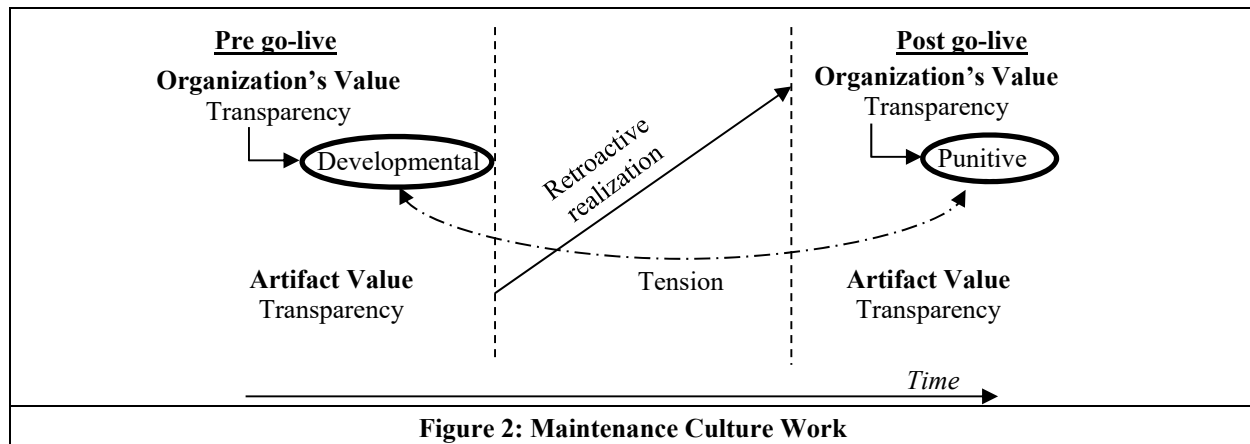
Figure 1: Transformation Culture Work⁴

It wasn't just because of audit issues that the hospital transformed. Rather the system bought about change in the hospital's values (e.g. retroactive realization) through the changes made by participants in the setting who saw the chance offered by the system to improve themselves. The retroactive realization resulted in misalignment with the hospital valuing standardization and the system still retaining the affordance to document flexibly. Additional culture work was later performed to resolve the resultant misalignment (described in optimization culture work). This is just one example of transformation culture work observed in the hospital. Staff regularly partook in activities that had the potential for transformation as they saw themselves as working for an organization that recognizes that change is normal. They set up interdisciplinary teams and held regular meetings and workshops emphasizing that the 'future is now'.

Maintenance Culture Work

Another type of culture work was observed when the hospital's values and system's values were in alignment, which we refer to as maintenance culture work. This was evidenced in the hospital when it came to transparency of information. The hospital valued transparency and the system also afforded the value of transparency in information. While valuing transparency, the tradition in the hospital was for staff to largely act on information in a post hoc manner. However, the system made information available in real-time. With the post-hoc approach, the information would be acted upon in a developmental, non-punitive manner. However, with real-time transparency there was the potential for individuals to quickly act on information punitively in the 'heat-of-the-moment'. It wasn't the system that valued a punitive approach. Rather, the system valued transparency of information, but the actions that could result from its use could be detrimental to other cultural values (Figure 2). This proved to be a growing challenge in the hospital:

"There's an urgency [now] to deal with [medication] problems that hasn't been there before ...Doctors don't deal well with direct feedback ...And how to do that respectfully with the appropriate amount of privacy, but with the appropriate urgency; it's just a difficult balance to strike....It is hard and we will make mistakes,...but the alternative is just to put our head in the sand. ...[It's] about being multi-disciplinary enough that you will cover ...enough perspectives on the problem; ...Everybody makes mistakes, everybody's learning. ...Just because it's got a name attached doesn't mean it's got blame attached" (Manager A, phase 2)



⁴ In this and subsequent figures, the arrows between pre go-live values and post go-live values represents that activities involved in the type of culture work, whether retroactive or proactive. In other words going live with the system doesn't automatically result in proactive or retroactive realization rather activities need to be performed.

Moreover, management reflected on poor practices based on outdated principles and the need for organizational learning so as detrimental impacts on related cultural values did not result.

“Some workforce issues have come up. Because people haven’t done care and somebody decides to get over-zealous looking at their reports, that nurse is a bad nurse. ...An over-zealous workforce new person, has no idea, and so that’s a deficit. Well not a deficit, but it’s a learning opportunity for us. We’ve got all the systems and processes based on old systems and we’re escalating workforce issues ...whether it be vexatious or somebody reading reports. ... So all of a sudden, we’ve got a workforce system that’s telling us we’re bad nurses. ...The unintended consequence of this is a bash to the culture. (Executive D, Phase 1)

Without maintenance culture work, retroactive realization could have occurred with the punitive value rising from the transparency of information. The maintenance culture work maintained the developmental value of the hospital. Some of the activities involved in maintenance culture work were future focused, such as discussions into organizational learning and ethics, while others were more reactive focused on minimizing the impact when the values temporarily shifted. Maintenance culture work, in short, pertains to activities to minimize the likelihood of a negative impact on associated cultural values.

Protection Culture Work

The hospital strongly valued evidence-based practice. The clinicians we spoke to largely viewed it as a combination of ‘art’ and ‘science’. The new systems also valued both the science and art components of evidenced-based practice with structured fields/processes and free text unstructured fields respectively. However, the system could be configured with powerful templates (referred to as powerplans) detailing how specific medical diagnoses could be treated. Some perceived that these powerplans were the epitome of evidenced-based practice and would result in unprecedented improvements in patient care. Yet, others were fearful that powerplans would shift the practice towards “recipe-based medicine”, which is a core concern of many clinicians as one nursing director states:

“I think we risk dumbing the [medical] system down and you won’t need high-level clinicians. You can just get anyone off the street to deliver this care because the computer says yes or no” (DON A, Phase 2)

Both before and after the wave 2 implementation, user committees were established and clinicians actively engaged. Recognizing potential concerns, the project leaders delayed implementing some powerplans and instead engaged in protection culture work. That is, due to the protection culture work, proactive realization occurred whereby the evidence-based practice value was retained but the science component was minimized (Figure 3).

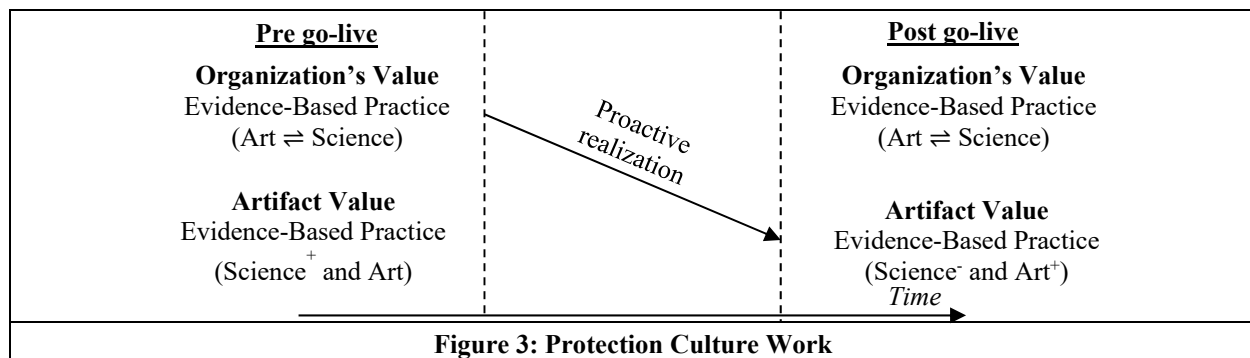


Figure 3: Protection Culture Work

Constrained Fit Culture Work

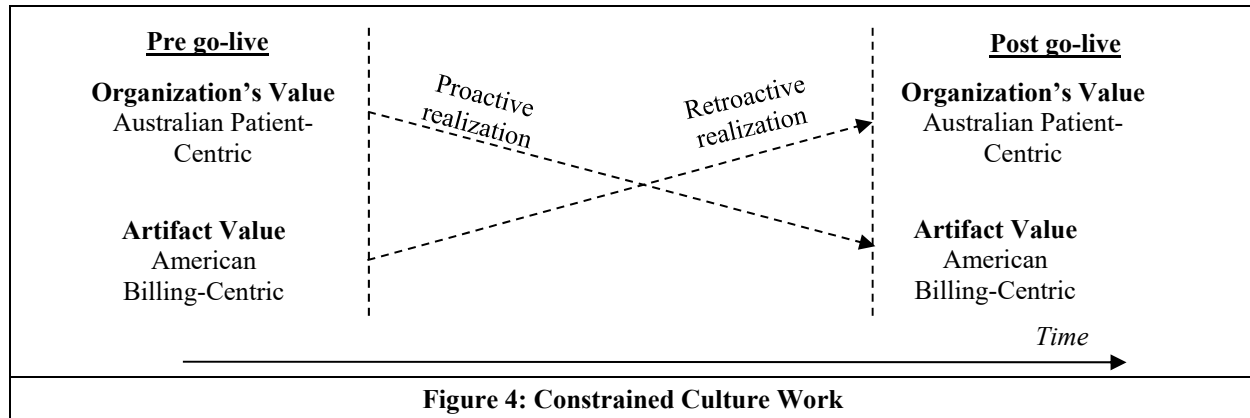
While transformational, maintenance, and protection culture work involved core values largely in alignment, albeit to varying degrees, constrained fit culture work involved activities performed when

actors are trying to improve the alignment between extreme disparate values. This was evident at our site as the system was a packaged solution from an American vendor, something many clinicians lamented:

“It’s an American system and America – for whatever reason – it is not a like for like service. And you would think that Americans obviously do health different and we do health different” (Executive B, Phase 2)

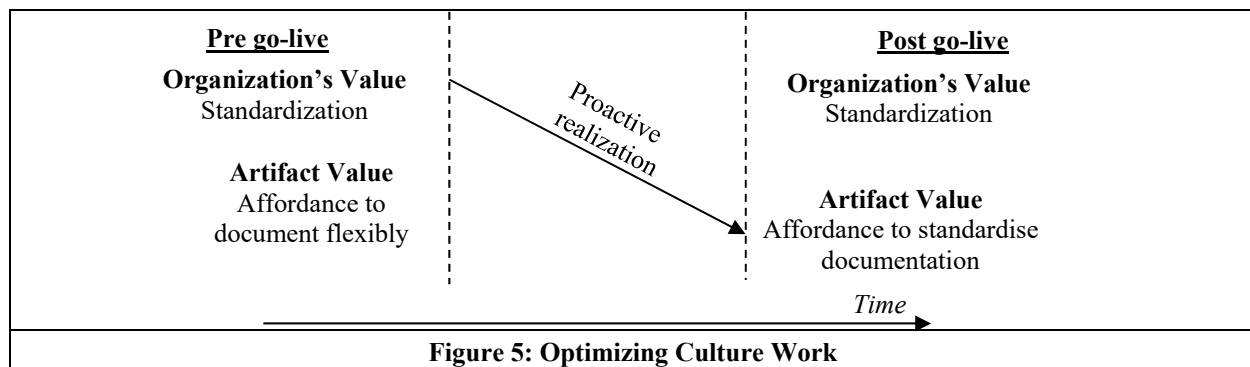
“Because it’s an American system, it’s more to do with billing” (Doctor, Phase 1).

The misalignment issues associated with national culture was so deeply engrained that constrained-fit culture work was unable to improve staff perception of alignment. Constrained fit culture work involved the simultaneous execution of activities present within both optimisation and fit-improving culture work. For instance, activities involving customising the system and simulation training with users had little to no effect and the system was still perceived to be misaligned with the hospital’s patient centric value (figure 4). It is expected that this perception will only be resolved until such time has passed where the staff see the system as an embodiment of the hospital not just an appendage.



Optimizing Culture Work

Similar to constrained culture work, optimization culture work are the activities to improve the alignment between the system and the hospital, however it is proactive in nature whereby the hospital (through the actions of key participants) push their values onto the system. A key example refers to the earlier transformation culture work example which resulted in misalignment between the hospital’s new value of standardization and the system’s value of affording flexible documentation. To improve the fit, a team was created to identify the different ways of documenting and identifying best practices. They then extended the system to include a dashboard detailing whether staff were documenting in the key areas, improving documentation. While the system still has multiple pathways, the extension increased the standardization afforded by the system and served as a motivator to document in a standard fashion (Figure 5).



Alignment Culture Work

In some instances where misalignment was present, participants sought to change the hospital (or themselves) to align it to the new system (rather than changing the system). We refer to this as *alignment culture work*. This was particularly relevant when it came to endorsing test results (e.g. urology, pathology, radiology). Prior to the implementation of the system when radiology tests were ordered the results would be inserted into the patient’s chart. In some instances the results were not checked and in other instances a single check mark would indicate that someone read it without saying who. This norm reflected clinicians’ preference for autonomy and protection from accountability. This could be highly problematic for patients:

“[Previously] there were some cases, for example ones that were really terrible misses, where we thought it was really obvious that there was a big lung cancer on the chest x-ray. And the doctors sent the patient home”. (Radiologist, Phase 1)

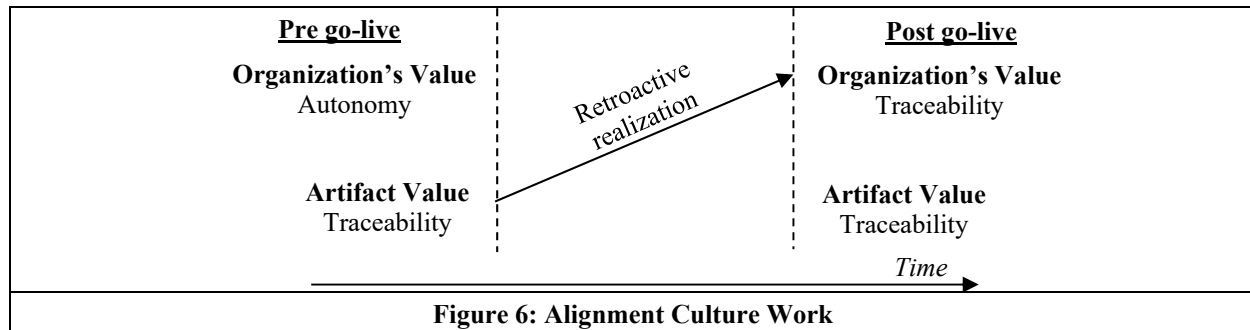
The HIS valued traceability and afforded the possibility of closed loop reporting. The system also included a dashboard to show which clinicians were failing to endorse and they could be held to account and educated in the importance of endorsing results. Leaders within the hospital knew the value of the traceability offered by the system and recognized the importance of endorsing (Figure 6), e.g., “closed loop reporting for us is the biggest benefit” (Radiologist, Phase 1). Significant improvements in endorsing were then observed:

“[We have] the best statistics for the endorsement of both pathology and radiology in the entire state.” (Pathologist, Phase 2).

“We see doctors now questioning how they do your analysis and reducing the amount of testing because they believe they’re over servicing?” (Executive F, Phase 2)

It is important to note that misalignment at the practice level is also expected to have an impact on the organizations values. As one executive states:

“What it’s doing is it’s questioning practice. So they’re having the conversation around, but this whole conversation around the [medications] are fantastic. That’s bloody brilliant. (Executive F, Phase 2)



Summary of Culture Work Findings

Our analysis resulted in the identification of six different types of culture work: transformation, maintenance, protection, constrained fit, IS optimization, alignment⁵. The types of culture work, their definition, and activities involved are summarized in table 2.

⁵The types of culture work are depicted by nouns for simplicity and can also be positioned as an action. For example *transformation culture work* can also be thought of as *transforming culture work*.

Culture Work Type	Definition	Example Activities
Transformation	The future focused activities involved in changing an organizations culture values	<ul style="list-style-type: none"> • Conduct future focused workshops • Establish interdisciplinary teams • Perform prospective reflection
Maintenance	The activities involved in preserving an organizations cultural values	<ul style="list-style-type: none"> • Return to and reiterate core values • Perform organizational learning • Reactively resolve negative cultural deviations.
Protection	The activities involved in retaining an equilibrium between a set of organizational cultural values.	<ul style="list-style-type: none"> • Establish user committees • Engage staff • Withhold parts of the IS.
Constrained Fit	The long-term activities involved in simultaneously changing the organization's and system's values in highly constrained settings.	<ul style="list-style-type: none"> • Perform simulation training • Optimize the IS
Optimization	The short-term and largely reactive activities involved in changing the IS cultural values.	<ul style="list-style-type: none"> • Optimize the IS • Perform technical fixes • Create a hot-line for technical issues
Alignment	The activities involved in changing the organizations culture to better align with the IS culture.	<ul style="list-style-type: none"> • Perform simulation training • Establish an adoption coach role • Reflect on practice

Discussion

The importance of organizational culture was highly salient in our case, and many of the clinicians and executives we spoke to argued that the implementation's success was driven by the hospital's health culture. When we dug down into the issue, however, we found many areas of misalignment between the hospital's culture and the culture embedded in the IS. Yet, we also observed effortful work to change the values of both the hospital and the system. It was this doing of culture – the culture work – that seemed critical. We now revisit our research question, “*How is culture work invoked throughout proactive and retrospective realization processes in an organizational change project?*”

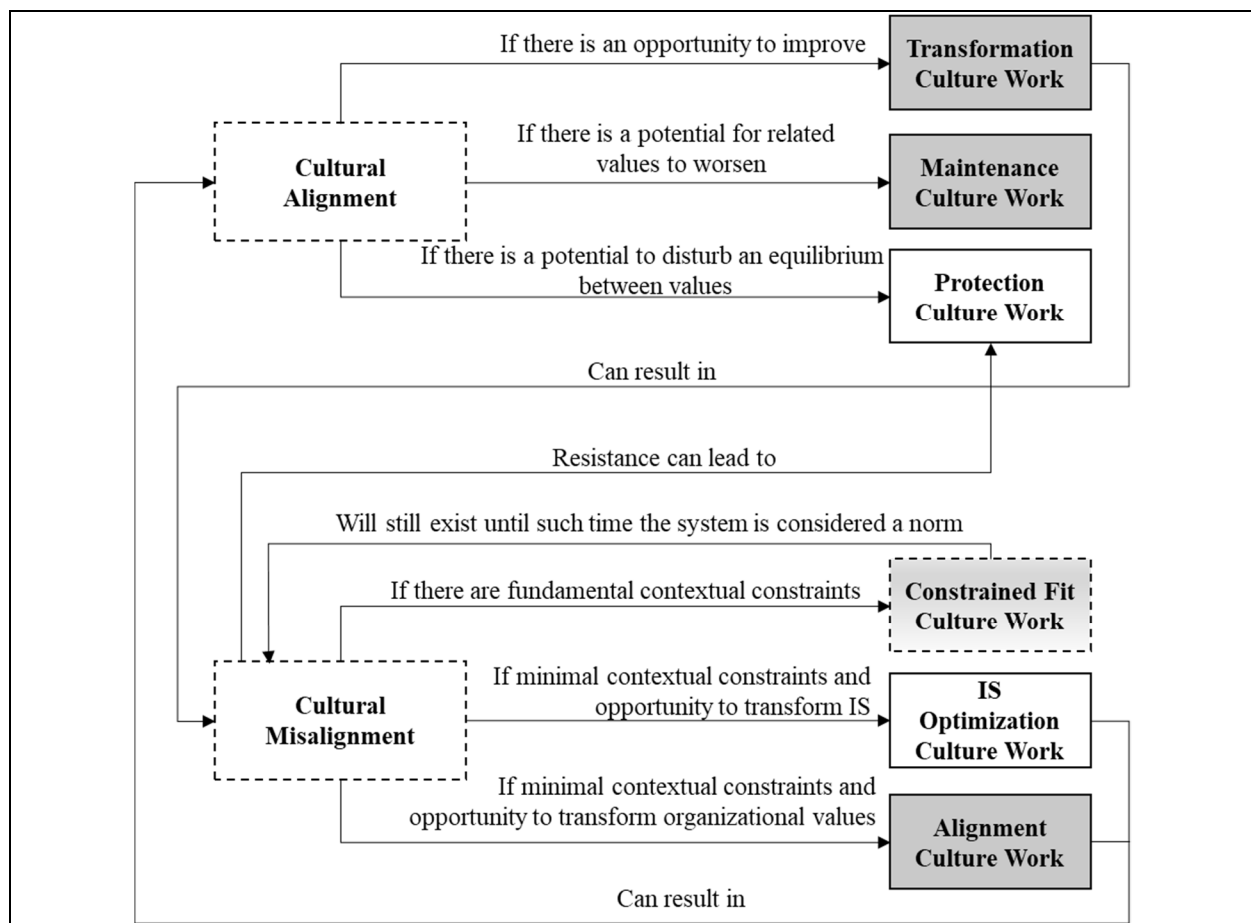
We answered this question by identifying six types of culture work associated with the realization process. Proactive realization included transformation, maintenance, and alignment culture work. Retroactive realization included protection, and optimization culture work. Constrained-fit culture work was present in both retroactive and proactive realization processes.

As Figure 7 shows, we also developed a process model of culture work. This responds to calls for more attention to process models in the literature (Burton-Jones et al. 2015; Pare et al. 2008). In a process approach, the states are considered to be necessary but not sufficient for the outcome state to occur (Mohr 1982). As such, the end state is only probabilistically reached (Mohr 1982). Translating this to Figure 7, if alignment between the organization's value and the system's value, and if members of the hospital perceives there to be an opportunity to improve themselves, transformation culture work can occur. Likewise, if misalignment occurs, and if there are minimal contextual constraints, and if members of the hospital perceives there to be an opportunity to transform the system, then IS optimization culture work can occur. However, there is no guarantee that the culture work will occur; there exists the *potential* for it.

The model we developed provides new insights into Schein's (1984) Model of Organizational Culture, Hatch's (1993) Cultural Dynamics Model, and the IS-Cultural alignment literature (Koch et al. 2013). In particular, an underlying, yet unstated assumption in the CDM is that the values of an organization are either in alignment or not in alignment with the artifact. However, many cultural values can be present in organizations, which may or may not be shared by all organizational members. Moreover, the perspective

of the artifact in the CDM is rather simplistic in that it does not take into account large, complex, integrated systems that possess multiple cultural values. In the context of large organizations, where multiple perspectives of cultural values exist with complex integrated systems involved, the cultural values possessed by the system or the organization can be in alignment or misalignment at the same time. This was observed in the hospital we studied, where some values were in alignment (e.g. flexibility) and others were not (e.g. national culture).

Moreover, in CDM, when misalignment exists between the artifact and the values of the organization, the artifact can either be ignored, physically ejected, or accepted alongside the culture. However, IS literature has demonstrated that even if the artifact is not in alignment different use patterns exist, such as workarounds (Strong and Volkoff 2010) and ineffective use (Burton-Jones and Volkoff 2017). Moreover, the system can be customized to better improve the fit between the system and organizations values (Avital and Te'Eni 2009), yet the ability to customize artifacts is not discussed in the CDM. In the hospital we studied, we observed that when misalignment existed proactive realization could occur that went beyond the system being ignored, ejected or accepted. This is because the system was not static and could be continuously optimized post-implementation to improve the alignment to the organization's values.



Legend:

- Gray shaded boxes with solid outline: Retroactive Realization
- White boxes with solid outline: Proactive Realization
- Gradient gray shaded boxes with dashed outline: Simultaneous Proactive and Retroactive Realization
- White boxes with dashed outline: Extent of alignment

Figure 7: Process Model of Culture Work within the Realization Process

The CDM and alignment literature both highlight that transformation of values can be triggered by misalignment. We also observed this in our case and examined the culture work involved in the process. Yet, these bodies of work do not delve deeply into what occurs if alignment is present. Alternatively, they largely treat alignment as a favorable end state. Our case study extends these bodies of literature through recognizing that even if alignment exists cultural transformation work and other types of culture work can still occur, which can even result in misalignment. Overall, as summarized in table 4, this research contributes to seminal organizational culture theories as well as literature on cultural alignment.

Table 4: Theoretical Contributions	
Theory	Contribution
Model of Organizational Culture (Schein 1984)	<ul style="list-style-type: none"> • Deepened the understanding of the relationship between organizational values and artifacts.
Cultural Dynamics Model (Hatch 1993)	<ul style="list-style-type: none"> • Identified that both proactive and retroactive realization processes can occur when misalignment or alignment are present. • Identified that multiple values (both organizational and system) need to be examined rather than just a singular value. • Deepened the understanding of the realization process through identifying six different types of culture work. • Provided a complex appreciation of artifacts.
Alignment literature	<ul style="list-style-type: none"> • Recognised that information systems can be in alignment with some values and misalignment with others. • Identified that transformation to values can occur even if the system is in alignment with the organization. • Identified that different levels of alignment can be present (high or low contextual constraints)

Conclusion

In summary, we sought to understand: “*How is culture work invoked throughout proactive and retrospective realization processes in an organizational change project?*” We identified six types of culture work: transformation, maintenance, protection, constrained fit, IS optimization, and alignment. We also developed a process model of culture work within the realization process and identified that different types of culture work are invoked depending on alignment and whether certain contextual states are present.

The examination of a complex artifact in a complex setting enabled us to obtain multiple insights into the proactive and retrospective realization process that go beyond those theorized previously. Collectively, these insights reveal the complexities involved in realization. Moreover, we extended alignment literature highlighting that even in the case of alignment cultural transformation can still result. In addition to its contributions to research, this research also provides executives with new insights into the work of culture and how culture is created, maintained, and disrupted in an IS context. Future research could investigate how other theories (e.g. Strong and Volkoff 2010) could inform the types of culture work.

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